Contribution ID: **22** Type: **Short contribution**

Optical potentials and knockout reactions from Green functions treatment

Wednesday, 17 October 2018 16:50 (15 minutes)

This presentation will show results of nucleon scattering and knockout reactions on medium-mass nuclei making use of optical potentials derived consistently from ab-initio Self Consistent Green Function (SCGF) with saturating Chiral Effective Field Theory (χEFT) interaction.

Summary

Structure and reactions are two crucial facets of nuclear physics. However, due to the lack of an essentially complete description of the nuclear many-body system, nuclear reactions have often relied on phenomenological models, namely fitting optical potentials on elastic scattering data.

This work aims to bridge the gap between the two branches of the discipline by building a common framework for structure and reactions. It proceeds by solving the nuclear many-body problem using the Dyson equation, returning a consistent self-energy which is microscopically equivalent to the generalized optical potential in the Feshbach theory. The properties of this self-energy will be discussed in the context of elastic scattering on Ca and O isotopes.

Comparing the low-energy scattering experimental cross sections and angular distributions will be shown that it is possible to reproduce features of elastic scattering in medium mass nuclei from chiral interaction and many-body calculation without additional phenomenological fitting.

The many-body wave functions obtained will be discussed in the context of knockout reactions, and compared with traditional optical (Wood-Saxon) model calculation.

Primary author: Dr IDINI, Andrea (Lund University)

Presenter: Dr IDINI, Andrea (Lund University)

Session Classification: Kärnfysikermöte

Track Classification: SFS-KF möte